CLAIMS

The invention claimed is:

1. A method of producing a polyol having increased functionality comprising:

providing a multifunctional alcohol, a vegetable oil, a second multifunctional compound having at least two hydroxyl (OH) groups;

reacting the multifunctional alcohol with the second multifunctional compound to form an esterified polyol; and

reacting the esterified polyol with a vegetable oil to form a second esterified polyol.

2. The method of producing a polyol having increased functionality of claim 1, wherein the second multifunctional compound comprises a saccharide compound.

3. The method of producing a polyol having increased functionality of claim 2, wherein the saccharide compound comprises a saccharide compound chosen from monosaccharides, disaccharides, oligosaccharides, sugar alcohols, and honey.

4. The method of producing a polyol having increased functionality of claim 1, wherein the vegetable oil is blown.

5. The method of producing a polyol having increased functionality of claim 1, wherein the vegetable oil comprises a vegetable oil chosen from palm oil, safflower oil, canola oil, soy oil, cottonseed oil, and rapeseed oil.

6. The method of producing a polyol having increased functionality of claim 1, wherein the vegetable oil comprises a blown vegetable oil chosen from blown palm oil, blown safflower oil, blown canola oil, blown soy oil, blown cottonseed oil, and blown rapeseed oil.

7. The method of producing a polyol having increased functionality of claim 2, wherein the saccharide compound comprises glucose.

8. The method of producing a polyol having increased functionality of claim 2, wherein the saccharide compound comprises sorbitol.

9. The method of producing a polyol having increased functionality of claim 2, wherein the saccharide compound comprises cane sugar.

10. The method of producing a polyol having increased functionality of claim 1, wherein the multifunctional alcohol comprises a multifunctional alcohol chosen from glycerin, butanediol, ethylene glycol, tripropylene glycol, dipropylene glycol, and aliphatic amine tetrol.

11. A method of producing a polyol having increased functionality comprising:

providing a multifunctional alcohol, a vegetable oil, a second multifunctional compound having at least two hydroxyl (OH) groups;

reacting the multifunctional alcohol with the second multifunctional compound to form a first esterified polyol;

reacting the first esterified polyol with the crude vegetable oil to form a second esterified polyol; and

blowing the second esterified polyol.

12. The method of producing a polyol having increased functionality of claim 11, wherein the vegetable oil comprises crude vegetable oil.

13. The method of producing a polyol having increased functionality of claim 11, wherein the second multifunctional compound comprises a saccharide compound.

14. The method of producing a polyol having increased functionality of claim 12, wherein the crude vegetable oil comprises soap stock and wax compounds.

15. The method of producing a polyol having increased functionality of claim 14, wherein the soap stock and wax compounds of the crude vegetable oil are removed.

16. The method of producing a polyol having increased functionality of claim 12, wherein the crude vegetable oil is partially blown prior to its reaction with the first esterified polyol.

17. The method of producing a polyol having increased functionality of claim 11, wherein the vegetable oil comprises a vegetable oil chosen from palm oil, safflower oil, canola oil, soy oil, cottonseed oil, and rapeseed oil.

18. The method of producing a polyol having increased functionality of claim 11, wherein the vegetable oil comprises a blown vegetable oil chosen from blown palm oil, blown safflower oil, blown canola oil, blown soy oil, blown cottonseed oil, and blown rapeseed oil.

19. The method of producing a polyol having increased functionality of claim 13, wherein the saccharide compound comprises a saccharide compound chosen from monosaccharides, disaccharides, oligosaccharides, sugar alcohols, and honey.

20. The method of producing a polyol having increased functionality of claim 13, wherein the saccharide compound comprises glucose.

21. The method of producing a polyol having increased functionality of claim 13, wherein the saccharide compound comprises sorbitol.

22. The method of producing a polyol having increased functionality of claim 13, wherein the saccharide compound comprises cane sugar.

23. The method of producing a polyol having increased functionality of claim 11, wherein the multifunctional alcohol comprises a multifunctional alcohol chosen from glycerin, butanediol, ethylene glycol, tripropylene glycol, dipropylene glycol, and aliphatic amine tetrol.

24. The polyol produced by reacting a multifunctional alcohol and a second multifunctional compound thereby forming a first esterified polyol and reacting the first esterified polyol with a vegetable oil to form a second esterified polyol.

25. The polyol of claim 24, wherein the second multifunctional compound comprises at least two hydroxyl (OH) groups.

26. The polyol of claim 24, wherein the second multifunctional compound comprises a saccharide compound.

27. The polyol of claim 26, wherein the vegetable oil is blown.

28. The polyol of claim 24, wherein the vegetable oil is blown.

29. The polyol of claim 24, wherein the vegetable oil comprises a vegetable oil chosen from palm oil, safflower oil, canola oil, soy oil, cottonseed oil and rapeseed oil.

30. The polyol of claim 24, wherein the vegetable oil comprises a blown vegetable oil chosen from blown palm oil, blown safflower oil, blown canola oil, blown soy oil, blown cottonseed oil, and blown rapeseed oil.

31. The polyol of claim 26, wherein the saccharide compound comprises a saccharide compound chosen from monosaccharides, disaccharides, oligosaccharides, and sugar alcohols.

32. The polyol of claim 26, wherein the saccharide compound comprises glucose.

33. The polyol of claim 26, wherein the saccharide compound comprises sorbitol.

34. The polyol of claim 26, wherein the saccharide compound comprises cane sugar.

35. The polyol of claim 24, wherein the multifunctional alcohol comprises a multifunctional alcohol chosen from glycerin, butanediol, ethylene glycol, tripropylene glycol, dipropylene glycol, and aliphatic amine tetrol.

36. A material comprising the reaction product of an A-side and a B-side wherein the B-side comprises an esterified polyol and a catalyst, wherein the esterified polyol comprises the reaction product of a first polyol, and a vegetable oil and the first polyol comprises the reaction product of a multifunctional alcohol and a second multifunctional compound.

37. The material of claim 36, wherein the second multifunctional compound comprises a saccharide compound.

38. The material of claim 36, wherein the vegetable oil is blown.

39. The material of claim 36, wherein the vegetable oil comprises a vegetable oil chosen from palm oil, safflower oil, canola oil, soy oil, cottonseed oil, and rapeseed oil.

40. The material of claim 36, wherein the vegetable oil comprises a blown vegetable oil chosen from blown palm oil, blown safflower oil, blown canola oil, blown soy oil, blown cottonseed oil, and blown rapeseed oil.

41. The material of claim 37, wherein the saccharide compound comprises a saccharide compound chosen from monosaccharides, disaccharides, oligosaccharides, sugar alcohols, and honey.

42. The material of claim 37, wherein the saccharide compound comprises glucose.

43. The material of claim 37, wherein the saccharide compound comprises sorbitol.

44. The material of claim 37, wherein the saccharide compound comprises cane sugar.

45. The material of claim 36, wherein the multifunctional alcohol comprises a multifunctional alcohol chosen from glycerin, butanediol, ethylene glycol, tripropylene glycol, dipropylene glycol, and aliphatic amine tetrol.

46. The material of claim 36, wherein the B-side further comprises a crosslinker.

47. The material of claim 46, wherein the crosslinker comprises a crosslinker chosen from glycerin, ethylene glycol, butanediol, dipropylene glycol, tripropylene glycol, dipropylene glycol, and aliphatic amine tetrol.

48. The material of claim 36, wherein the B-side further comprises a blowing agent.

49. The material of claim 48, wherein the blowing agent comprises a blowing agent chosen from water, acetone, methyl isobutyl ketone, methylene chloride, a hydrochloroflurocarbon, and a hydroflurocarbon.

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50. The material of claim 36, wherein the isocyanate comprises a diisocyanate compound.

51. The material of claim 36, wherein the isocyanate comprises an isocyanate chosen from 2,4 diisocyanate, 4,4' diphenylmethane diisocyanate, 2,4 diphenylmethane diisocyanate, and toluene diisocyanate.

52. The material of claim 36, wherein the isocyanate comprises a prepolymer comprising the reaction product of a vegetable oil and an isocyanate.

53. The material of claim 36, wherein the B-side further comprises a petroleum based polyol.

54. The material of clam 53, wherein the petroleum based polyol comprises a petroleum based polyol chosen from polyether polyol, polyester polyol, and polyurea polyol.

55. A material comprising the reaction product of a vegetable oil and the reaction product of a first multifunctional alcohol and a second multifunctional compound.

56. The material of claim 55, wherein the second multifunctional compound comprises a saccharide compound.

57. The material of claim 55, wherein the vegetable oil is blown.

58. The material of claim 55, wherein the vegetable oil comprises a vegetable oil chosen from palm oil, safflower oil, canola oil, soy oil, cottonseed oil, and rapeseed oil.

59. The material of claim 55, wherein the vegetable oil comprises a blown vegetable oil chosen from blown palm oil, blown safflower oil, blown canola oil, blown soy oil, blown cottonseed oil, and blown rapeseed oil.

60. The material of claim 56, wherein the saccharide compound comprises a saccharide chosen from monosaccharides, disaccharides, oligosaccharides, sugar alcohols, and honey.

61. The material of claim 56, wherein the saccharide compound comprises cane sugar.

62. The material of claim 55, wherein the first multifunctional alcohol comprises a multifunctional alcohol chosen from glycerin, butanediol, ethylene glycol, tripropylene glycol, dipropylene glycol, and aliphatic amine tetrol.

63. The material of claim 55, wherein the vegetable oil is a modified crude vegetable oil comprising the reaction product of a crude vegetable oil and a second polyol comprising the reaction product of a second multifunctional alcohol and a third multifunctional compound.

64. The material of claim 63, wherein the crude vegetable oil is crude soy oil.

65. The material of claim 63, wherein the third multifunctional compound comprises a second saccharide compound.

66. The material of claim 63, wherein the modified crude vegetable oil is blown.

67. A method of producing a polyol having increased functionality comprising:

providing a multifunctional alcohol, a vegetable oil, a second multifunctional compound having at least two hydroxyl (OH) groups;

reacting the multifunctional alcohol with the second multifunctional compound to form an ester; and

reacting the ester with the vegetable oil to form an esterified polyol.

68. The method of producing a polyol having increased functionality of claim 67, wherein the second multifunctional compound comprises a saccharide compound.

69. The method of producing a polyol having increased functionality of claim 68, wherein the saccharide compound comprises a saccharide compound chosen from monosaccharides, disaccharides, oligosaccharides, sugar alcohols, and honey.

70. The method of producing a polyol having increased functionality of claim 67, wherein the vegetable oil is blown.

71. The method of producing a polyol having increased functionality of claim 67, wherein the vegetable oil comprises a vegetable oil chosen from palm oil, safflower oil, canola oil, soy oil, cottonseed oil, and rapeseed oil.

72. The method of producing a polyol having increased functionality of claim 67, wherein the vegetable oil comprises a blown vegetable oil chosen from blown palm oil, blown safflower oil, blown canola oil, blown soy oil, blown cottonseed oil, and blown rapeseed oil.

73. The method of producing a polyol having increased functionality of claim 68, wherein the saccharide compound comprises glucose.

74. The method of producing a polyol having increased functionality of claim 68, wherein the saccharide compound comprises sorbitol.

75. The method of producing a polyol having increased functionality of claim 68, wherein the saccharide compound comprises cane sugar.

76. A material comprising:

the reaction product of:

an isocyanate;

the reaction product of a first polyol and a vegetable oil, wherein the first polyol is the reaction product of a multifunctional alcohol and a second multifunctional compound; and

a catalyst.

77. The material of claim 76, wherein the isocyanate is a diisocyanate compound.

78. The material of claim 76, wherein the isocyanate comprises an isocyanate chosen from 2,4 diisocyanate, 4,4' diphenylmethane diisocyanate, 2,4 diphenylmethane diisocyanate, and toluene diisocyanate.

79. The material of claim 76, wherein the isocyanate comprises a prepolymer comprising the reaction product of a vegetable oil and an isocyanate.

80. The material of claim 76, wherein the isocyanate comprises an isocyanate and a blowing agent.

81. The material of claim 80, wherein the isocyanate further comprises a crosslinker.